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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,858	04/28/2006	Shlomo Ruschin	27/281	4874
7590 01/24/2008 Mark Friedman Bill Polkinghorn 9003 Florin Way Upper Malboro, MD 20772			EXAMINER BOLDA, ERIC L	
			ART UNIT 3663	PAPER NUMBER
			MAIL DATE 01/24/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/577,858

**Applicant(s)**

RUSCHIN ET AL.

**Examiner**

ERIC BOLDA

**Art Unit**

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-36 and 42-51 is/are pending in the application.
- 4a) Of the above claim(s) 33, 48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-32, 34-36, 42-47 and 49-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is responsive to Applicant's amendment of Nov. 13, 2007.
2. The objections to amended claim 27 and 42 are withdrawn in view of the amendment.

### ***Response to Arguments***

3. Applicant's argument regarding 35 USC 103(a) rejections of claims 27-32, 34-36, 42-47 and 49-51 have been considered but are moot in view of the new rejections below. However, the Examiner disagrees with the Applicant that the Yegnanarayanan et al. reference cited in the rejection does not deal in *any* way with optical amplification (Remarks, p. 6). On the contrary, the apparatus disclosed may be integrated with optical amplifiers (e. g. (202) in Fig. 2 or (312)-(318) in Fig. 3). Therefore the reference is still considered relevant to applicant's invention and is cited in the rejection of claims

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 27, 28, 34, and 42, 43, 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Leheny et al. (US 3,761,837).

Leheny discloses in Fig. 1 an apparatus for achieving optical amplification of a light at a given wavelength (2<sup>nd</sup> col. lines 9-11)

- a body of indirect-gap semiconductor (Gallium phosphide) doped with at least one element (nitrogen or bismuth) (2<sup>nd</sup> col. lines 26-28, and lines 40-41)
- a pumping source (12) irradiating a target region (15) of the semiconductor with light at a wavelength shorter than the given wavelength (2<sup>nd</sup> col. lines 60-63).

It is inherent that the dopant generates at least one added energy level within the energy band-gap of the semiconductor. This is what determines the wavelength of the emitted light in the case of a laser. Note however that nothing in Leheny prevents the device being used as an optical amplifier, i. e. amplifying an additional input source at a wavelength longer than the pump source. In the method of operation of the apparatus, the semiconductor is irradiated with light resulting in population inversion of charge carriers within the target region, thereby causing amplification (2<sup>nd</sup> col. lines 53-56).

With regard to claims 28 and 43, the wavelength of the pump is less than a wavelength of a photon corresponding to the gap transition of Gallium phosphide.

With regard to claims 34 and 49, the pump light is provided continuously.

Note that the citations made herein are done so for the convenience of the applicant; they are in no way intended to be limiting. The prior art should be considered in its entirety.

### ***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 29-32, 35-36, and 44-47, 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leheny in view of Yegnanarayanan et al. (US 2003/0142943). Leheny does not disclose that the indirect bandgap semiconductor is Silicon, nor that it is doped with gold. Yegnanarayanan teaches in analogous field of endeavor apparatus and method of optical signal control of an optical signal passing through a Silicon semiconductor, comprising the steps of providing a body of indirect-gap semiconductor doped with at least one element (gold or platinum, see para. [0026]). The dopant creates at least one energy level inside the energy band gap para. [0007], thereby enabling an energy transition between said added energy level and an energy band of the semiconductor corresponding to generation of a photon of a range of wavelengths (at least one of a given wavelength). Fig. 2 shows that an optical signal is directed to the target region (waveguide) of the semiconductor. It would have been obvious to one skilled in the art (e. g. an optical engineer) to try silicon as an alternative to gallium phosphide in the laser and method of optical amplification of Leheny, since it is notoriously well-known that silicon is an indirect bandgap semiconductor and that other optical devices are made out of silicon (Yegnanarayanan, Abstract). Further it would be obvious to replace the nitrogen or bismuth dopant by gold or platinum, as suggested by Yegnanarayanan, to obtain gain at different wavelengths from those in Leheny.

With regard to claims 32 and 47, the given (signal) wavelength is approximately 1.54 microns (Yegnanarayanan.)

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Eric Bolda

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663